REPLACED BY ART 34 AMDT

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
PC-21003381		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE 2003/000607	16.04.2003	16.04.2002
International Patent Classification (IPC) or national classification and IPC		
C08J 9/32		
Applicant		
Borealis Technology OY et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12.11.2003	08.03.2004
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2003/000607

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-18 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 19-21 received by this Authority on 12.11.2003
pages* _____ received by this Authority on _____

☐ the drawings:

pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/SE 2003/000607

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims		NO
Inventive step (IS)	Claims	1-20	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

1: WO 9319927 A1
2: WO 9728213 A1
3: EP 0557807 A1
4: EP 0575012 A1
5: US 5218016 A
6: US 6251995 B1
7: EP 0521582 A1
8: WO 9905447 A1

The cited documents represent the general state of the art. The invention defined in claims 1-20 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed syntactic polyolefin composition for pipe coating, method for the preparation of a syntactic polyolefin composition or off-shore pipe coated with syntactic polyolefin composition. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-2 is novel and is considered to involve an inventive step. The invention is industrially applicable.

CLAIMS

1. A syntactic polyolefin composition for pipe coating, characterised in that the composition comprises a β-nucleated propylene polymer comprising a β-nucleating agent and microspheres, said composition having a melt flow rate (MFR_2; ISO 1133, condition D) at 230°C/2.16kg in the range of 0.05-30 g/10 min and in that the composition has an elongation at break of at least 3%.

2. A syntactic polyolefin composition according to claim 1, characterised in that said composition has a melt flow rate (MFR_2; ISO 1133, condition D) at 230°C/2.16kg in the range of 0.5-10 g/10 min and preferably in the range of 1.0-5 g/10 min.

3. A syntactic polyolefin composition according to claim 1 or 2, characterised in that said composition has an elongation at break of >5% and preferably >10%.

4. A syntactic polyolefin composition according to any one of claims 1 to 3, characterised in that the β-nucleated propylene polymer is a (co)polymer which comprises at least 90.0 weight% of propylene and up to 10.0 weight% of α-olefins with 2 or 4 to 18 carbon atoms, and that the propylene polymer has a melt flow rate of 0.1-8 g/10 min at 230°C/2.16 kg.

5. A syntactic polyolefin composition according to any one of claims 1 to 4, characterised in that the composition further comprises a polyolefin homopolymer having a melt flow rate of 100-1500 g/10 min at 230°C/2.16 kg.

6. A syntactic polyolefin composition according to any one of claims 1 to 5, characterised in that the amount of polyolefin is 0-20 weight%, preferably 15-20 weight%.

7. A syntactic polyolefin composition according to any one of claims 1 to 6 , characterised in

that the tensile modulus of the composition is at least 1500 MPa determined according to ISO 527.

8. A syntactic polyolefin composition according to any one of claims 1 to 7, characterised in that the compression strength at 20 MPa/80° determined according to ASTM D695, is > 10 MPa, preferably >15 MPa.

9. A syntactic polyolefin composition according to any one of claims 1 to 8, characterised in that the K-value of the composition is less than 0.190 W/m°K.

10. A syntactic polyolefin composition according to any one of claims 1 to 9, characterised in that the density of the composition is 500-850 kg/m3.

11. A syntactic polyolefin composition according to any of claims 1 to 10, characterised in that said microspheres are made of glass, ceramics, epoxy resin, phenolic resin or urea-formaldehyde resin.

12. A syntactic polyolefin composition according to any one of claims 1 to 11, characterised in that said microspheres are untreated microspheres.

13. A syntactic polyolefin composition according to any one of claims 1 to 12, characterised in that said microspheres have an outer diameter of 1-500 µm, preferably 5-200 µm.

14. A syntactic polyolefin composition according to any one of claims 1 to 13, characterised in that said microspheres are hollow.

15. A syntactic polyolefin composition according to any one of claims 1 to 14, characterised in that said microspheres are present in an amount of 10-50 weight%, preferably 20-30 weight% of the composition.

16. A method for the preparation of a syntactic polyolefin composition for pipe coating according to any one of claims 1-15, characterised in that microspheres are evenly distributed by melt mixing in a composition comprising a β-nucleated propylene polymer and microspheres, said composition having a melt flow

rate at 230°C/2.16kg in the range 0.05-30 g/10min and in that the composition has an elongation at break of at least 3%.

17. A method according to claim 16, c h a r a c t e r i s e d in that said microspheres are added to the molten polymer.

18. A method according to claim 16 or 17, c h a r a c t e r i s e d in that the composition is compounded/homogenised and extruded as a coating on an off-shore pipe in one continuous step.

19. A method according to claim 16 or 17, c h a r a c t e r i s e d in that the composition is pelletized in a first step and in a subsequent step extruded as a coating on an off-shore pipe.

20. An off-shore pipe coated with a syntactic polyolefin composition, c h a r a c t e r i s e d in that the pipe is coated with a composition according to any one of claims 1-15.